
WSDOT FOP for ASTM C 805¹***Rebound Hammer Determination of Compressive Strength of Hardened Concrete*****1. SCOPE**

This test method is not intended as an alternative for strength determination. If the proper method is used, by an experienced operator, it can be a useful tool in estimating strength. In some specifications it has been designated as a criteria for evaluating early strength gain for opening work to traffic. The procedure provided herein is in conformance with ASTM C 805. In case of any apparent conflicts the procedure from the referenced standard shall apply. It is recommended that the region is notified, or assistants with field testing.

2. EQUIPMENT

- a. Use hammer type N for testing concrete in building and bridge construction.
- b. Rebound hammers shall be serviced and verified/calibrated at least annually using a calibration anvil, semiannually if in heavy use. Interim checks against a newly-adjusted hammer are recommended.
- c. Immediately after calibration a consistent object, such as a column or foundation should be tested and record the average readings. This item can now be used as a reference, in the same way as an anvil.

3. SELECTION OF TEST LOCATION

- a. Vertical, formed surfaces of concrete structures are preferred.
- b. Avoid form joints, honeycombs, raked surfaces, and porous areas. Avoid thin structural parts and specimens less than 4 in. (100 mm) thick.

4. PREPARATION OF TEST LOCATION

- a. Before testing, remove any plasterwork or coating or the cement slurry from the top surface of the concrete
- b. Slightly uneven surfaces shall be smoothed by hand with the carborundum stone supplied with the hammer.
- c. A minimum area of 6 in. (150 mm) in diameter will be ground to permit 10 test hammer impacts to be made on the mortar without hitting coarse aggregate particles.
- d. With old concrete the excessively hard surface layer must be removed to a depth of about $\frac{1}{2}$ in. (13 mm) For this work a high speed, hand-held, power grinder should be sufficient.

5. TESTING THE SPECIMEN

- a. Lightly pressing on the head of the impact plunger, release the plunger and allow it to slide out of the housing.
- b. Press the plunger against the point of the concrete surface to be tested, holding the hammer exactly at right angles to the surface being tested. Maintain pressure on the instrument and slowly increase the pressure on the housing to effect release of the plunger. Just before it disappears completely in the housing, the hammer is released.

¹This FOP is based on ASTM C 805-97

- c. After the impact, the hammer mass rebounds by a certain amount which is indicated on the scale by the rider. Do not touch the push-button lock mechanism until after the hammer is released and has stabilized.
- d. Estimate the rebound number on the scale to the nearest whole number and record the rebound number.
- e. By simply removing the hammer from the spot tested, it is reset for a further test and at the same time the indication is canceled. The rider never returns quite to zero while the plunger is in its extended position.
- f. Take ten readings from each test area. No two impact tests shall be closer together than 1 in. (25 mm). Examine the impression made on the surface after impact, and if the impact crushes or breaks through a near-surface air void disregard the reading and take another reading.
- g. After having finished the tests, the plunger is locked in its rear position by means of the push-button. Locking should always be done after releasing the impact, with the plunger still inside the housing. The lock also serves for fixing the rebound reading after impact tests in dark or not easily accessible locations.

6. CALCULATION OF REBOUND NUMBERS AND INTERPRETATION OF REBOUND VALUES

- a. Discard readings differing from the average of 10 readings by more than 6 units and determine the average of the remaining readings. If more than two readings differ from the average by six units, discard the entire set of readings and determine rebound numbers at 10 new locations within the test area.
- b. Converting the rebound number to estimated compressive strength (psi) (Mpa) shall be done after calculating the average of at least ten readings. Compute the average reading of the ten values accumulated. Convert this reading to estimated compressive strength using the calibration scale on the side of the hammer.
- c. The test hammer is calibrated for horizontal impact direction, for testing vertical surfaces. On the side of the test hammer there is a label showing the curves used to convert rebound values to estimated compressive strength. If you are testing a vertical surface you use the 0° scale.
- d. When using it on inclined or horizontal surfaces, the rebound value must be corrected. To correct the reading for an inclination angle, testing in an upwards direction use the +45° or +90° curves, testing downwards use the -45° or -90° curves. The direction of impact, horizontal, downward or upward must be the same for readings to be compared, unless a correction factor is established.

7. REPORTING TEST INFORMATION

All of the following should be recorded, if known:

Date and time of testing.

Identification of location tested in the concrete construction and the type and size of member tested.

Design strength of concrete tested.

Surface characteristics.

If the surface was ground and depth of grinding for older (+/yr) concrete.

Type of form material used.

Curing conditions and type of exposure to the environment.

Hammer identification, serial number, and date of last calibration/verification.

Air temperature at the time of testing.

Orientation of hammer during test.

Individual rebound test readings and average rebound number for each area tested.

Remarks regarding discarded readings or unusual conditions.

8. OTHER FACTORS THAT MAY AFFECT TEST RESULTS

Concrete at 32°F (0°C) or less may exhibit high rebound values, as will near surface coarse aggregate. The temperature of the hammer itself may affect the rebound number. Rebound hammers at 0°F (−22°C) may exhibit lower readings. A lightweight aggregate mix may also show lower readings.

9. REFERENCED DOCUMENTS

ASTM Standard C805-94.

Operating instructions, Schmidt Concrete Test Hammer.

Performance Exam Checklist***Rebound Hammer Determination of Compressive Strength of Hardened Concrete***
FOP For ASTM C 805

Participant Name _____ Exam Date _____

Procedure Element	Yes	No
1. Copy of current procedure available at test site?	<input type="checkbox"/>	<input type="checkbox"/>
2. Hammer properly serviced and calibrated or verified?	<input type="checkbox"/>	<input type="checkbox"/>
3. Test location properly prepared?	<input type="checkbox"/>	<input type="checkbox"/>
4. Test location meets minimum size requirement?	<input type="checkbox"/>	<input type="checkbox"/>
5. Ten acceptable readings taken in each test area?	<input type="checkbox"/>	<input type="checkbox"/>
6. Readings properly spaced in test area?	<input type="checkbox"/>	<input type="checkbox"/>
7. Test readings properly converted to estimated strength?	<input type="checkbox"/>	<input type="checkbox"/>
8. Test information properly recorded?	<input type="checkbox"/>	<input type="checkbox"/>
9. All calculations performed correctly?	<input type="checkbox"/>	<input type="checkbox"/>

Equipment

10. Where required are calibration/verifications tags present on equipment used in this procedure?	<input type="checkbox"/>	<input type="checkbox"/>
11. All equipment functions according to the requirements of this procedure?	<input type="checkbox"/>	<input type="checkbox"/>

First attempt: Pass ☐ Fail ☐Second attempt: Pass ☐ Fail ☐

Signature of Examiner _____

Comments:

[illegible]